

With all these theories before us, these currents and counter-currents in evolutionary thought bearing us rapidly along, at times perhaps carrying us somewhat out of our depth, the conclusion of the whole matter is that in the present state of zoology it will be wise to suspend our judgment on many theoretical matters, to wait for more light, and to confine our attention meanwhile to the observation and registration of facts, to careful experiments, and to repeated tests of mere theoretical assumptions.

Meanwhile we may congratulate ourselves that we have been born and permitted to labour in this nineteenth century, the century which in zoological science has given us the best years of Lamarck's life, a Cuvier, a Darwin, a Von Baer, an Owen, an Agassiz, a Haeckel, a Spencer, and a Huxley—the founders of modern zoology—who have sketched out the grander features of our science so completely, that it will, perhaps, be the work of many coming years to fill in the details.

Prof. Packard discussed in detail the geological causes of variation and of the extinction and renewal of species, but space cannot, unfortunately, be found to reproduce this portion of his address.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

PROF. W. M. DAVIS, who now holds the chair of Physical Geography in Harvard University, has been elected Sturgis Hooper professor of geology in the same university.

UNDER the will of the late Mr. Vincent Stuckey Lean, the Trustees of the British Museum receive 50,000*l.*, to be devoted to the improvement and extension of the library and reading-room of the Museum.

THE Technical Education Board of the London County Council has awarded one of its commercial scholarships to Mr. W. M. Poole, of Magdalen College, Oxford, who is an assistant-master of the Merchant Taylors' School. The scholarship is of the value of 150*l.*, and will enable Mr. Poole to proceed to some of the commercial colleges in foreign countries and study their method of commercial teaching.

THE agricultural experiments carried out by Prof. William Somerville in the counties of Cumberland, Durham, and Northumberland, and the Durham College of Science, Newcastle-upon-Tyne, should prove of distinct benefit to agriculture in the North of England. The work is done in connection with the County Councils of the counties mentioned, and it forms a most valuable branch of technical education. The seventh annual report just issued contains accounts of numerous field experiments, the results of which are of scientific as well as practical value. Satisfactory evidence of interest in this phase of technical education is shown by the fact that a great demand has arisen in the county of Durham for lectures explanatory of the experimental results. Investigation has thus been the means of quickening an interest in the science of agriculture.

AT the ninth meeting of University Extension and other students to be held in Oxford from July 29 to August 23, a number of lectures will be given to illustrate, as far as possible, the more remarkable contributions to science during the period 1837 to 1871. Prof. Francis Gotch, F.R.S., will deal with the physiology of sensation; Prof. E. B. Poulton, F.R.S., will deal with the modes in which the colours, markings, and attitudes of animals are of value for the struggle of life; Prof. W. J. Sollas, F.R.S., will lecture on the geology of Oxford; Prof. H. A. Miers, F.R.S., will lecture on the growth of a crystal; Mr. G. C. Bourne and Mr. A. W. Brown will deal with the growth of the living organism; Dr. Arthur Ransome, F.R.S., will lecture on hygiene; Mr. G. J. Burch on wireless telegraphy; Mr. H. N. Dickson on the influence of climate; and Dr. Reginald Farrar on anthropology. There will also be classes in geology (with field excursions conducted by Prof. Sollas), and in biology.

THE London County Council has delegated to its Technical Education Board such new powers and duties as it has acquired by receiving recognition under Clause vii. of the Directory of the Department of Science and Art (see p. 498). The Board is communicating with the various schools and institutions which are in receipt of grants both from the Board and from the Department, with a view to making the necessary arrangements

for carrying out the provisions of Clause vii. The new Board recently appointed consists of twenty representatives from the London County Council, three from the London School Board, two representing the City Parochial Charities Foundation, three appointed by the City and Guilds of London Institute, three from the London Trades Council, and one each from the Incorporated Association of Headmasters and the National Union of Teachers. There are in addition two co-opted members. The Board have decided to introduce some important changes into the regulations for intermediate county scholarships, and the alterations will take effect in the examination to be held in June, 1900.

SCIENTIFIC SERIALS.

American Journal of Science, March.—Studies in the Cyperaceæ, by T. Holm. This article deals with the genus *Lipocarpha*, formerly regarded as a species of *Hypelytrum*.—The constitution of the ammonium-magnesium phosphate of analysis, by F. A. Gooch and Martha Austin. The presence of ammonium chloride or other ammonium salt is necessary in the precipitation of manganese as the ammonium-manganese phosphate by microcosmic salt, in order that the precipitate may have the ideal constitution NH_4MnPO_4 . Further research shows that the chemical constitution of the precipitate rather than mechanical contamination and varying solubility may be responsible for observed variations in the weight of the residue derived by the ignition of the similar salt of magnesium NH_4MgPO_4 , precipitated by an excess of a soluble phosphate from the solution of a magnesium salt.—The crystal symmetry of the minerals of the mica group, by T. L. Walker. The examination of crystals not only by the goniometer, but also by the etching progress, and as regards their optical, electric, thermal and cohesive properties, has had the effect of a widespread degradation of crystals from systems of higher to systems of lower degree of symmetry. This tendency is especially shown by minerals of the mica group. Biotite, phlogopite, rubellan and lepidolite are not monoclinic but triclinic, while muscovite is either monoclinic, or, if it be triclinic, it is so very finely polysynthetically twinned that we cannot find a triclinic individual large enough to respond to the optical or etching method.—Imperfectly known and new Actinians, by A. E. Verrill. The specimens described include a new genus *Phelliopsis*, having a general appearance and habit resembling *Phellia*, and two new species, *Anthopleura japonica* and *Bunodactis manni*.—Some American fossil Cycads: Part i., the male flower of Cycadeoidea, by G. R. Wieland. The living Cycads constitute one of the most ornate and characteristic orders of plants, and occupying, as they do, a position on the border-land between the higher Cryptogams and the lower Phanerogams, their ancestral relationship is of considerable interest. The author has examined a collection of rare fossils from the Rocky Mountains, now in the museum of Yale University. The results strengthen the belief that the relation between Ferns and Cycads must have been a very close one.—Footprints of Jurassic Dinosaurs, by O. C. Marsh. One of the most interesting geological discoveries during the past season in the Black Hills region was a locality of footprints made by Dinosaurian reptiles in deposits of Jurassic age. These footprints are the first found in American Jurassic strata. They are all tridactyle, of large size, and were evidently made by some of the great Dinosaurs known to have lived during Jurassic time.—A new Kansas meteorite, by H. L. Ward. This meteorite was found in Ness County, and weighs 417 grms. It no longer has the usual black crust.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, March 2.—“On Hydrogen Peroxide as the active Agent in producing Pictures on a Photographic Plate in the Dark.” By Dr. W. J. Russell, V.P.R.S.

In previous papers the author has been shown that certain bodies are able, in the dark, to act on a photographic plate and produce a picture. The present communication shows that in all the cases which have been examined, and probably in all others of a similar kind, the action which occurs is due directly or indirectly to the presence of hydrogen peroxide.

March 9.—“A Preliminary Note upon certain Organisms isolated from Cancer, and their Pathogenic Effects upon Animals.” By H. G. Plimmer, Pathologist, and Lecturer on Pathology and Bacteriology, St. Mary's Hospital, London. Communicated by Prof. J. Rose Bradford, F.R.S.

During the past six years I have been studying the cell-inclusions found in cancer, and for this work I have had to examine 1278 cancers taken from various organs and parts. Out of this large number of cases there have been a few—nine in all—in which the cell-inclusions have been extremely numerous; so that at the growing edge, and even far into the tumour, scarcely a cell could be found without an inclusion, sometimes with as many as thirty-six, even, of these inclusions in one cell; and these bodies have been similar to those which Metschnikoff, Ruffer, and others, as well as myself, have regarded and described as parasites, standing in causal relationship to the disease.

It will be seen that I mean by “cell-inclusions” those bodies found in cancer cells which are not recognisable as any known degeneration, and which do not form any part of the cell.

I have succeeded in isolating from the last of these cases, an organism, which is pathogenic, in a peculiar manner, to certain animals, and whose virulence I have been able to keep unimpaired for some months.

Previous Work on the Experimental Production of Tumours in Animals.

The only work, I think, that needs mention here is that of Sanfelice, in Cagliari, and of Roncali, in Rome. Sanfelice has produced tumours in animals with organisms which he isolated from infusions of various fruits; and they both have isolated organisms from cancers. But Sanfelice's organism appears to have been very difficult to isolate in a virulent form from human cancer, and to keep virulent; so that in his last paper,¹ he treats only of the organisms derived from fruit infusions, and of their effects upon animals. Most of their statements are doubted by the German pathologists, including such a good observer as Baumgarten. But I do not find any reason to doubt any of Sanfelice's statements; and I think that he deserves the greatest credit for removing the study of the ætiology of cancer from the histological to the experimental region of work.

On the Method of Isolation adopted.

The cancer, from which the organisms described were isolated, and with which my experiments have been made, was taken from the breast of a woman aged thirty-five years; it had a history of only two months' duration, and it was growing rapidly at the time of the operation. Immediately after removal, I examined a fresh scraping, and, finding such an extraordinary number of the bodies I have mentioned in the cells, I cut thin slices from the growth, which I placed with a little of the juice scraped from the cut surface in a flask containing the following liquid, which was of course carefully sterilised. This medium consisted of an infusion made from cancer, just as the ordinary beef infusion is made, to which was added, after careful neutralisation, 2 per cent. of glucose and 1 per cent. of tartaric acid. Upon this medium scarcely any bacteria, however hardy, will grow; so that contaminations are not common.

Then, remembering that in the body these organisms were under anaërobic conditions, I exhausted the air from my flasks, and passed hydrogen into them, finally sealing them up. This I have found is of great importance as regards the maintenance of the virulence; and I find that my cultures are as active now as they were four months ago. By these means, I got, after from three to five days, a pure culture of the organism described, which has been kept growing in this, and various other media, ever since.

Morphology and Relation to Media.

The organism is apparently a saccharomyces; but, according to some authorities (such as De Bary, Cuboni, and Duclaux), the saccharomyces are nothing but the developmental stages of fungi which really belong to either the Phyco-, Asco-, or Basidio-mycetes. Moreover, they state that in some species of mycelium-forming fungi, single parts, especially conidia, can

grow in the saccharomyces form on certain nutrient media; so I will not attempt to locate this organism at present. Sanfelice and Roncali, however, definitely state that the organisms they have isolated are Blastomycetes.

When grown in the medium described, these organisms produce a cloudiness which becomes visible in about forty-eight hours, and increases till about the sixth day, when the growth sinks to the bottom, the medium then becoming clear; no scum or pellicle is formed.

When grown on this medium solidified with agar, the organisms form small round colonies which remain separate; after some weeks the colour, which was originally white, becomes yellow; the colonies do not attain a large size at any time.

Gelatin is not liquefied, but the growth on this medium is never luxuriant. On potato a thick white layer is formed, which in about two weeks will cover the entire surface, changing then to a yellowish brown colour.

They will grow aërobically, but not well, at any rate at first; and they lose their virulence in a short time, when grown in this way.

Microscopically they are round bodies, frequently growing in clumps, with a central portion which stains deeply, and, in most cases, with a thin, strongly refractile capsule, which sometimes shows a double contour; but young forms can be seen which are without a capsule. The size varies from 0.004 mm. to 0.04 mm.

Their reproduction appears to be by budding; but I have fancied that I have also seen, in a few instances, endogenous budding.

These bodies correspond morphologically with those found in the original tumour, and also with those described by Ruffer and myself, and by some others of those who have worked at the microscopical appearances of cancer.

Experimental Results.

These can be summarised under the four following divisions. Up to the present, I have not been able to make any such experiments upon animals as would allow of the easy bringing of the organisms into contact with a likely epithelial surface, with the exception of the cornea; but, through the kindness of Dr. Bradford, I have been enabled now, at the Brown Institution, to inoculate a bitch in the mammae, but the time is as yet too short to enable me to make any statement as to the result.

The cultures used in the experiments were made in the medium previously described.

(1) Negative results. Rabbits inoculated intravenously and intraperitoneally; and rabbits and guinea-pigs inoculated subcutaneously. The animals were killed in from fifteen days to fourteen weeks. I have left none longer than this.

(2) Those animals in which death was produced without any obvious lesion; but from the organs of which pure cultures of the organism were made. These consisted of rabbits which were trephined, the organisms being then placed under the dura mater. The organisms were present in the brain, cord, and viscera.

(3) Corneal inoculation, in rabbits, in which true neoplasms were produced. There was considerable proliferation of the corneal epithelium, which had forced its way in all directions from the point of inoculation, deep down into, and between, the fibrous layers of the corneal tissue. The organisms were found in the epithelial cells.

(4) Positive results: the animal dying with the production of new growths. These results are found in guinea-pigs inoculated intraperitoneally. Death ensues in from thirteen to twenty days: and the liver, lungs, and peritoneum are found studded with new growths of a white colour, which are of an endothelial nature. Pure cultures could be made from the growths.

The important point of this work is: the experimental production of malignant tumours in animals by an organism isolated from a malignant tumour in man. That these experimental tumours are, so far with one exception, of endothelial origin is due to the fact that until I was enabled to inoculate a dog, I found it very difficult to get the organism in contact with likely epithelium; all the above methods of inoculation, save one, could only bring them into contact with endothelial surfaces. The corneal experiment is the only one in which an epithelial surface was tried; and in this case the great proliferation of the epithelium, the appearances of the organisms in the cells, and the irritation produced, are very striking.

¹ “Zeitschrift für Hygiene,” 1899.

The deductions which I think may fairly be made from these observations and experiments are as follows:

(1) That there are certain cancers, which occur very rarely, in which there are in enormous numbers, intracellular bodies of the kind described by Ruffer, myself, and others, as parasitic Protozoa. (From the rarity of these cases and their comparatively acute course, one is tempted to think that they are not due to the same cause as ordinary cancers; but there is really no more difference between them and ordinary cancers than between acute and chronic tubercle.)

(2) That these intracellular bodies can be isolated and cultivated outside the body.

(3) That these cultures, when introduced into certain animals, can cause death, with the production of tumours; so far, with the exception of the corneal growths, of endothelial origin; and that pure cultures can be made from these growths, which, when inoculated into suitable animals, will produce similar tumours.

Linnean Society, March 16.—Dr. A. Günther, F.R.S., President, in the chair.—Dr. John Lowe communicated some observations on the fertilisation of *Araujia albens*, G. Don, a Brazilian climber, which in the south of England grows in the open air. Last summer it was blooming freely in Lord Ilchester's garden at Abbotsbury, where the flowers were visited by numbers of butterflies, diurnal moths, humble-bees, wasps, and large flies, many of which were captured and imprisoned for a time in the pinching-bodies (*Klemm-körper* of Müller). All these insects, with the exception of some humble-bees, in their visits to the nectar left their proboscis behind, and sometimes a leg, being not strong enough to detach the pinching-body. Dr. Lowe described the structure of the pinching-bodies, which are flat horny plates situated, above the nectar-cups, at each angle of a five-sided hollow cone in the centre of the flower, in which is placed the stigma. There is only a small opening at the apex and a narrow slit at the base of each facet of the cone. To the upper point of the pinching-body the pollinia are attached. When an insect has its proboscis caught in the slit, which narrows always to its point, it can only escape by tearing away the body with its pollen-masses or by leaving its proboscis in the slit. In the former case it carries the pollinia to the next flower it visits, and thus effects cross-fertilisation by leaving the pollen-mass between the anther-wings, whence it rapidly passes into the cone. He had received a number of flowers of *Araujia* from Mr. Benbow, the gardener at Abbotsbury, in some of which he found the proboscis of a butterfly or moth in each of the five angles of the cone, showing the great destruction of insect-life caused by the plant. Mr. N. E. Brown, who has made a special study of the Asclepiadaceæ, gave an interesting account of the manner in which the pollinia reach the stigma; and some further remarks were made by Mr. A. W. Bennett.—Mr. P. Chalmers Mitchell read a paper on so-called "quinto-cubitalism" in the wing of birds. He showed that the terms "aquantocubital" and "quinto-cubital," applied to birds because of certain conditions in the wings, were misleading, and proposed the new terms "diastataxy" and "eutaxy." From general considerations based on the anatomy and osteology of *Columbae*, he concluded that the eutaxic forms were clearly more highly specialised forms, and that they had been derived from diastatatic forms. Comparative anatomy making it exceedingly probable that "diastataxy" is the primitive condition among birds, Mr. Mitchell proceeded to show that the primitive existence of a gap was not difficult to explain.—Mr. W. P. Pycraft read a paper entitled "Some facts concerning the so-called 'aquantocubitalism' in the bird's wing." He showed, by means of a series of lantern slides, that "aquantocubitalism" was due to a shifting, backwards and outwards, of the secondary remiges 1-4 and of the horizontal rows of coverts 1-5. The terms—suggested by Prof. E. Ray Lankester—"stichoptilous" and "apoptilous" were proposed as substitutes for the older and less convenient terms quinto- and aquinto-cubitalism. All wings, it was shown, are, in the embryo, stichoptilic, and later may become apoptilic. Hence the author felt inclined to regard the former as the more primitive arrangement. Prof. E. Ray Lankester, F.R.S., in some remarks upon the two preceding papers, gave reasons for preferring the terms "stichoptilous" and "apoptilous" in substitution for those which had been adopted by the authors. Both authors were agreed on the main issue, at which they had arrived independently, one through the study of development, the other through that of adult anatomy.

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Geological Society, May 18.—W. Whitaker, F.R.S., President, in the chair.—Relations of the chalk and drift in Möen and Rügen, by Prof. T. G. Bonney, F.R.S., and the Rev. Edwin Hill. These two islands are separated in a north-westerly to south-easterly direction by about thirty-five miles of sea. They both exhibit at many spots the chalk and drift, in relations which are peculiar and abnormal. Some geologists maintain that the glacial beds have been included in the chalk by a series of acute folds; others that they have been dropped down by a series of faults; others, again, explain the relationship as the result of ice-action. Simple faulting appears to be insufficient, while it is a circumstance not easily explained by earth-movement or ice-action that the axes of the folds in the chalk strike roughly east-north-east to west-south-west in Möen, and north and south in Rügen. The authors then describe a series of sections in Möen, which lead them to the following conclusions: (a) The chalk dominates greatly over the clay, the latter being often merely a local phenomenon. (b) The chalk is stained brown, and the clay streaked with chalk for a few inches from the junction. (c) The clay is often a mere facing to the chalk, or occupies semi-cylindrical or wedge-shaped cavities, which sometimes seem to terminate above sea-level. (d) The clay seems often associated with superficial ravines, which are probably never much prolonged below the sea-level. The chalk is strongly folded, but rarely, if ever, faulted, and there is no evidence to connect the intercalations of drift with faults. Numerous sections in Rügen are then described, which (though there are differences in detail) present a general resemblance to those in Möen, and, as a rule, have no resemblance to those near Cromer.—A critical junction in the County of Tyrone, by Prof. Grenville A. J. Cole. The investigations of the author have led him to the conclusion that the granite of Eastern Tyrone is identical with that of Slieve Gallion.

PARIS.

Academy of Sciences, March 27.—M. van Tieghem in the chair. Obituary notice of M. Charles Naudin, by M. Ed. Bornet.—M. Gaudry announced the death of Prof. O. C. Marsh, Correspondant in the Section of Mineralogy.—The Perpetual Secretary announced the death of Prof. G. H. Wiedemann, Correspondant in the Physical Section.—Obituary notice of Prof. Wiedemann, by M. Mascart.—The deformation of surfaces of the second degree, by M. G. Darboux.—The effect produced upon the motion of inclination of a bicycle by the lateral displacements given by the rider, by M. J. Boussinesq.—Note on some properties of the radiation of uranium and radio-active substances, by M. Henri Becquerel. The intensity of the uranium radiations, as measured by their photographic action, appears to undergo no diminution with time, since some uranium compounds enclosed in a leaden box since May 1896, and hence absolutely shut off from all known sources of radiation, still have the same action upon a photographic plate as when first set up. The rays do not appear to be capable of polarisation, all attempts to repeat two early experiments giving positive results in this direction having failed. Bodies, such as glass, receiving these rays, give off a secondary radiation very similar in nature to that observed by M. Sagnac for the X-rays.—On the explosive aptitude of acetylene when mixed with inert gases, by MM. Berthelot and Vieille. Two sets of mixtures were examined, acetylene and hydrogen, and acetylene and coal gas. These were gradually compressed, and the pressure zone determined within which the propagation of the explosive wave was possible.—Preparation and properties of crystallised calcium phosphide, by M. Henri Moissan. By carefully heating an intimate mixture of carbon and calcium phosphate in the electric furnace, it is possible to obtain a crystallised calcium phosphide containing only traces of calcium carbide and unreduced phosphate. The phosphide obtained in this way forms reddish-brown crystals, which fuse only at a very high temperature. Chlorine is without action in the cold, but a violent reaction sets in at 100° C. Analyses show that the composition of the phosphide is Ca_3P_2 .—On the properties and applications of aluminium, by M. A. Ditte. Copper-aluminium alloys containing from three to six per cent. of copper are more readily attacked by aqueous solutions than aluminium itself; the copper remaining untouched forms innumerable couples tending to accelerate the solution of the more easily oxidisable metal.—Observations of Swift's comet (1899 a), made with the

large equatorial of the Observatory of Bordeaux, by MM. G. Rayet and F. Courty.—Observations of the sun, made at the Observatory of Lyons, during the last quarter of 1898, by M. J. Guillaume. The results are formulated in three tables giving the number and area of sun-spots, their distribution in latitude, and the distribution of the faculæ in latitude.—On functions defined by a Taylor's series, by M. L. Leau.—On some arithmetical properties of analytical functions, by M. Paul Staedel.—On the existence of fundamental functions, by M. W. Stekloff.—On functions of several variables, by M. H. Lebesgue.—On the magnetic elements in Roumania on January 1, 1895.—A question of priority concerning the equation $k - i/(k + 2)d = \text{constant}$, between the dielectric constant and the density, by M. D. Negreano. This relation was given theoretically by H. A. Lorentz in 1880, and proved experimentally by the author in 1887 to be true for several hydrocarbons. The Mosotti-Clausius formula, $g = k - i/k + 2$, where g is the distance between the molecules, is not identical with the above, as the density does not appear.—On the Wehnelt commutator, by M. H. Pellat.—On a new apparatus designed to show the space relation of radiographs, and to search for foreign bodies, by M. A. Londe.—Transformation of the Galilean telescope into a range-finding instrument, by M. G. Humbert.—On the mixture of gases and the compressibility of gaseous mixtures, by MM. Daniel Berthelot and Paul Sacerdote. Experiments were carried out on mixtures of carbon dioxide and sulphur dioxide, air, and a mixture of hydrogen and oxygen.—On the decomposition of carbonic oxide in presence of metallic oxides, by M. O. Boudouard. The oxides of iron, nickel and cobalt were studied, at a temperature of 650°, the softening point of the glass tubes used, and the composition of the gaseous mixture determined as a function of time of contact with the oxide.—On the decomposition of carbon dioxide in presence of carbon, by M. O. Boudouard. A similar set to experiments to those described in the preceding paper, but with charcoal taking the place of the metallic oxides.—On the dissociation of mercuric oxide, by M. H. Pélabon.—Action of the bis-diazoic chlorides of benzidine, of ortho-toluidine, and of dianisidine upon the malonates of ethyl and methyl, by M. G. Favre.—Detection of mercury in the produce of vines treated with mercurial broths, by MM. Leo Vignon and J. Péraud. The amounts of mercury found are so small that, in the author's opinion, the utilisation of mercuric chloride for the treatment of diseases of the vine is subject to no serious objections from the hygienic point of view; but the action on the plant itself is so serious, that for this reason alone corrosive sublimate should not be used in combating diseases of the vine.—Remarks by M. Berthelot on the preceding paper.—Toxic albumen extracted from the flesh of the eel, by M. Eloupe Bénéch.—Morbid predispositions of the puerperal period, by M. A. Charrin.—Action of the pancreas upon the diphtheric toxin, by MM. Charrin and Levaditi. The pancreas exerts an attenuating action upon bacterial toxins.—Death from continuous electrical currents, by MM. J. L. Prevost and F. Battelli.—Researches on the sensitive nerve terminations in voluntary striated muscle, by M. D. Poloumordwinoff.—*Botrytis cinerea* and the disease of *la toïle*, by M. Beauverie.—On a tachylite from the bottom of the N. Atlantic, by M. P. Termier.—On the captive balloon ascents of March 24, by M. Léon Teisserenc de Bort.

DIARY OF SOCIETIES.

THURSDAY, APRIL 6.

LINNEAN SOCIETY, at 8.—On *Carex Wahlenbergiana*: C. B. Clarke, F.R.S.—On the Discovery and Development of Rhabdites in Cephalopods: F. J. Cole.

FRIDAY, APRIL 7.

GEOLOGISTS' ASSOCIATION, at 8.—The Geology of Brittany, with Special Reference to the Whitsuntide Excursion: Dr. Charles Barrois.

SATURDAY, APRIL 8.

GEOLOGISTS' ASSOCIATION.—Cycling Excursion—Winchfield to Wokingham. Director: H. W. Monckton.

MONDAY, APRIL 10.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—The Industrial Technical Treatment of Sherry and of British Colonial Wines: Dr. J. T. W. Thudichum.

VICTORIA INSTITUTE, at 4.30.—Babylonian Deities: Theo. G. Pinches.

TUESDAY, APRIL 11.

ROYAL INSTITUTION, at 3.—Zebras and Zebra Hybrids: Prof. J. Cossar Ewart, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Paper to be further discussed: Alloys of Iron and Nickel: Robert Abbott Hadfield.—And, time permitting: Buenos Aires Harbour Works: James Murray Dobson.

MINERALOGICAL SOCIETY, at 8.—On a Mass of Meteoric Iron lately found in Patagonia: L. Fletcher, F.R.S.—On Langbeinite from the Mayo Salt Mines, in the Punjab: F. R. Mallet.—On the Use and Advantages of a Three-Circle Goniometer: G. F. Herbert Smith.

ROYAL PHOTOGRAPHIC SOCIETY, at 8.—The Correct Exposures to be given to Photographs of the Corona: E. W. Maunder.

WEDNESDAY, APRIL 12.

SOCIETY OF ARTS, at 8.—Telephones: John Gavey.

GEOLOGICAL SOCIETY, at 8.—(1) Fossils in the University Museum, Oxford. 1. Silurian Echinoidea and Ophiuroidea; (2) On the Occurrence of Sponge-Spicules in the Carboniferous Limestone of Derbyshire: Prof. W. J. Sollas, F.R.S.—On Spinell and Forsterite from the Glenelg Limestone: C. T. Clough and Dr. Wm. Pollard.

THURSDAY, APRIL 13.

ROYAL INSTITUTION, at 3.—The Atmosphere: Prof. J. Dewar, F.R.S.

MATHEMATICAL SOCIETY, at 8.—Note on the Characteristic Invariants of an Asymmetric Optical System: T. J. Bromwich.—Concerning the Four Known Simple Linear Groups of Order 25920, with an Introduction to the Hyper-Abelian Linear Groups: Dr. L. E. Dickson.—On the Direct Determination of Stress in an Elastic Solid, and on the Stress in a Rotating Lamina: J. H. Michell.—The Theorem of Residuation, Noether's Theorem, and the Riemann-Roch Theorem: Dr. F. S. Macaulay.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.

FRIDAY, APRIL 14.

ROYAL INSTITUTION, at 9.—Earth Currents and Electric Traction: Prof. A. W. Rücker, Sec. R.S.

ROYAL ASTRONOMICAL SOCIETY, at 8.

MALACOLOGICAL SOCIETY, at 8.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—On Birds and Stipules: Sir John Lubbock (Paul).—National Association for the Promotion of Technical and Secondary Education, 11th Annual Report (London).—Massachusetts Institute of Technology, Boston, Annual Catalogue, 1898-99 (Boston).—Text-Book of the Embryology of Invertebrates: Drs. Korschelt and Heider, Vol. 2, translated by M. Bernard (Sonnenschein).—Report of Observations of Injurious Insects, &c., during the Year 1898: E. A. Ormerod (Simpkin).

PAMPHLETS.—The Future of the Metric and Imperial Systems of Weights, &c.: J. Manning (Sonnenschein).—Une Excursion Electro-technique en Suisse (Paris, Gauthier-Villars).

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